this journal has completed eighteen volumes, which are esteemed both at home and abroad for their valuable scientific contents and the excellence of book-making. In 1903, for lack of funds, it temporarily suspended publication. . . .

Following the lead of the *Journal of Morphology* came the *Journal of Comparative Neurology and Psychology*, the *American Journal of Anatomy*, the *Anatomical Record* and the *Journal of Experimental Zoology*. These journals were assigned to the Wistar Institute because of its efforts to bring about a mutually beneficial cooperation which would lead to greater scientific results with the same outlay of time and money.

They comprise nearly all the independent technical journals in their respective sciences. Their editors are leading men in the branches they represent, and the articles published are the best results from American laboratories.

They represent no school or exclusive band of workers, nor any group of self-centered laboratories. On the contrary, the chiefest aim is to obtain and retain for them an eminently national character, and encourage through the highest grade of biological research the efforts and cooperation of investigators wherever found. . . .

These journals have been and will always be a source of pride to American scholarship, and they are indispensable to those who desire to keep abreast of the times. The effort to increase their circulation is principally to put the original work done in America before as large a number of students as possible, here and abroad—that all may share in this movement for a more vigorous life in these branches.

The chief idea, which the Wistar Institute is following in publishing these journals, is to maintain the editorial management, so far as possible, outside of its own staff. The reasons are evident. The results thus far are most gratifying, and there is every reason to expect a very great increase in the efficiency and value of the undertaking.

The work of this department of the Wistar Institute alone brings the institute and the University of Pennsylvania into relations with nearly every laboratory in the world where anatomy and zoology are studied.—*Old Penn, Weekly Review of the University of Pennsylvania.*

SCIENTIFIC BOOKS

Modern Electrical Theory. By NORMAN ROBERT CAMPBELL, M.A. Pp. xii + 332. Cambridge University Press. 1907.

The past fifteen years have witnessed the erection, upon the foundation of Maxwell's theory, of a great structure of theoretical and experimental knowledge which, for some time to come, will undoubtedly occupy a very large place in the interest and attention of students of physical science. Maxwell's theory was, in the main, the work of a single man of genius; it was general in its point of view, was little concerned with details, and thus possessed a kind of obvious unity which made it easy of comprehension when once the initial difficulties had been overcome. The modern development of electrical theory, on the other hand, has had to deal in great detail with a large number of complex phenomena of apparently diverse character. What is now called the electron theory is the result of the labors of many men, working in different branches of physics and chemistry, with various points of view, and often without recognition of the general, theoretical bearing of their results.

Under these conditions a work like the one before us is of especial value and utility. The author has chosen his material wisely and combined it with skill; he has given a simple and perspicuous account of the theory and of its application to the many and diverse phenomena which have been brought within its scope. The introduction of unnecessary details has been avoided, and although there are inevitably a great many trees, the forest is still distinctly visible. The perspective is thoroughly good and the point of view is not that of the popularizer of second-hand knowledge. Mr. Campbell has worked for many years in the Cavendish Laboratory, which for two generations has been the chief center of progress in electrical science; he has made important contributions to the theory of

which he writes, and his book reveals an intimate and professional knowledge of his subject. It is not, however, addressed exclusively to a professional audience; while not exactly food for babes, it does not assume an extensive preliminary knowledge of the subject, and the necessary mathematical developments are presented in an elementary way, so that any one who is not averse to recalling his knowledge of elementary algebra and geometry may read the book with pleasure and profit.

A marked characteristic of modern physics is the free and fearless use of hypotheses—a use which would have been regarded as dangerous, or at least unscrupulous, in the days before we had been taught by the example of great masters like Faraday, Kelvin and Maxwell, that hypotheses were the most useful of all the instruments of research. In those days a hypothesis was considered to be justifiable only when its author could look forward with confidence to the time when it should be raised to the greater dignity of a "theory," and perhaps ultimately be proved to be "true." How far we have advanced from this position is indicated by Professor J. J. Thomson's remark that a physical theory is not a creed, but a policy, and by Mr. Campbell's statement (p. 231) that "a false hypothesis is better than none." This attitude must, of course, be thoroughly understood by the reader. He must recognize that the model structures which are used in this book to explain electrical and optical phenomena are not the only ones possible even at the present time; and that, as investigation proceeds, they will have to be modified and in many cases rejected altogether in favor of others which more perfectly represent the results of experience.

H. A. Bumstead

Einleitung in die Experimentelle Morphologie der Pflanzen. Von Dr. K. Goebel. 8vo, pp. vi + 260, with 135 figures. Leipzig and Berlin, B. G. Teubner. 1908. Price 8 Marks.

This book, which is an amplification of a series of lectures delivered by Professor Goebel in the winter of 1906–7, is one of the most suggestive botanical contributions of recent years. Not only botanists of moderate training, but scientific gardeners should be able to read the work, repeat the experiments and devise new ones. The apparatus is usually very simple, as the author says, "a plant, a pot of dirt and a question." Little attention is paid to the direct effect of light, heat, etc., the reader being directed to Pfeffer's "Pflanzenphysiologie," and Goebel's "Organographie" for a discussion of these factors. For experimental work on lower plants, reference is made to Klebs's "Ueber Probleme der Entwickelung."

There is no attempt at completeness, the book being intentionally an introduction rather than a hand-book.

The titles of the five chapters indicate the scope of the work. (1) The Field of Experimental Morphology, (2) Influencing the Form of the Leaf by Internal and External Conditions, (3) Conditions for the Various Development of Main and Side Axes, (4) Regeneration, (5) Polarity.

In addition to the question, *How* does development proceed, there is another, *why* does it so proceed. The book is most deeply concerned with the second question. Plants diverging from the usual form are called freaks; some plants develop one form under moist conditions and another under dry; some plants have juvenile stages quite different from the adult form; injuries often cause a plant to develop in a direction not followed by the normal plant, etc. Experimental morphology attempts to answer the questions raised by such phenomena. That heredity must be reckoned with is not questioned. The acorn gives rise to an oak, and the beech nut to a beech tree; but normal stages in development may be skipped, after a later stage there may be a return to an earlier, and this because the various stages in development are dependent upon internal conditions which may be influenced by external factors. Development may be checked at a certain stage, when conditions for the succeeding stage are not present.